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Cetylpyridinium Chloride: Butanol
2:1 by weight

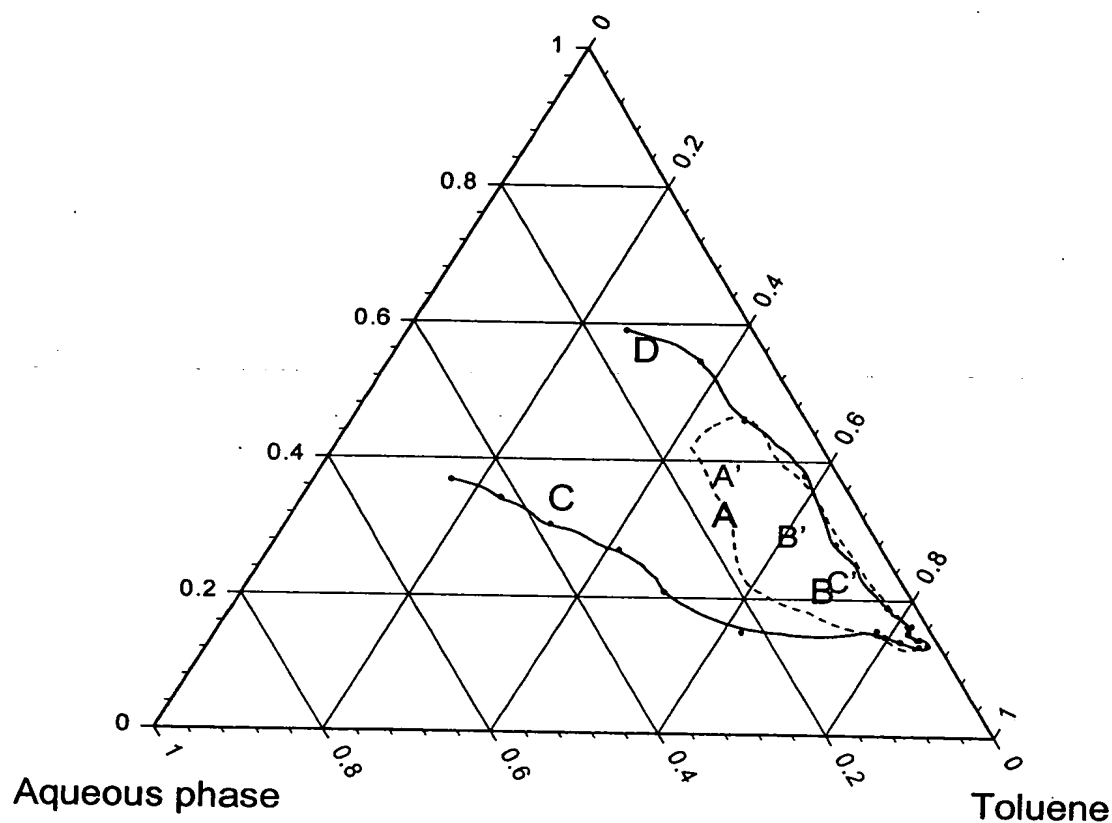


Figure 1. Phase diagrams with the surfactant CPC and cosurfactant butanol in the ratio of 2 to 1 by weight. The region enclosed in black line is the one with double the standard molar ratio of structure directing agent (1.2 : 1.0 triethylamine : phosphoric acid). The dash-line region represents standard molar ratio of triethylamine in the aqueous phase (0.6 : 1.0 triethylamine : phosphoric acid). A-D are compositions chosen for hydrothermal synthesis with double the molar ratio of triethylamine. A'-C' are compositions chosen for hydrothermal synthesis with the standard molar ratio of triethylamine.

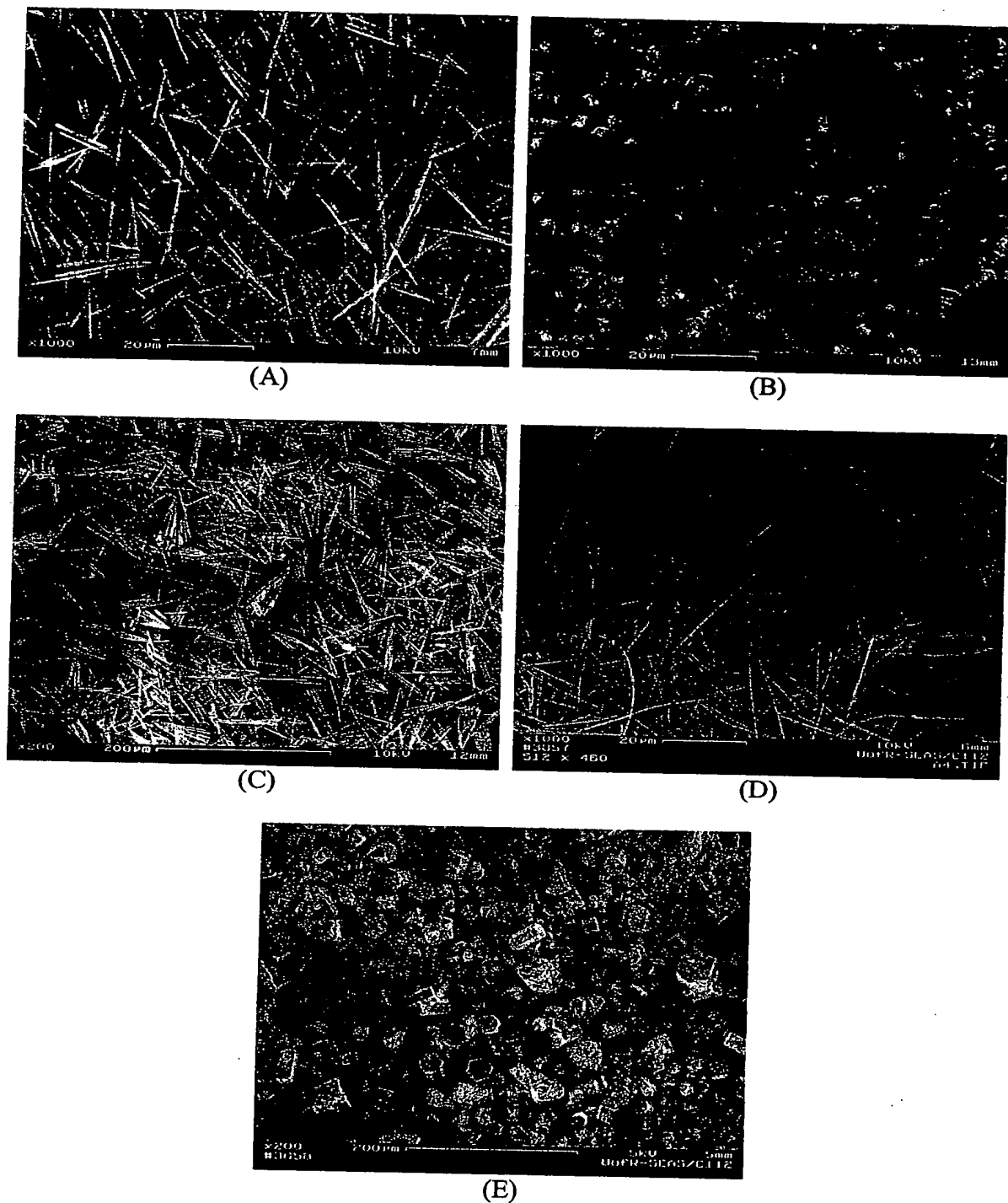


Figure 2. Products from conventional heating (6 hrs at 180°C) with double the standard amount of triethylamine. Figures 2A to 2D correspond to microemulsion compositions A to D respectively from Figure 1. Figure 2E is the control experiment without the microemulsion. The scale bars are 20 microns for A, B, and D; 200 microns for C and E.

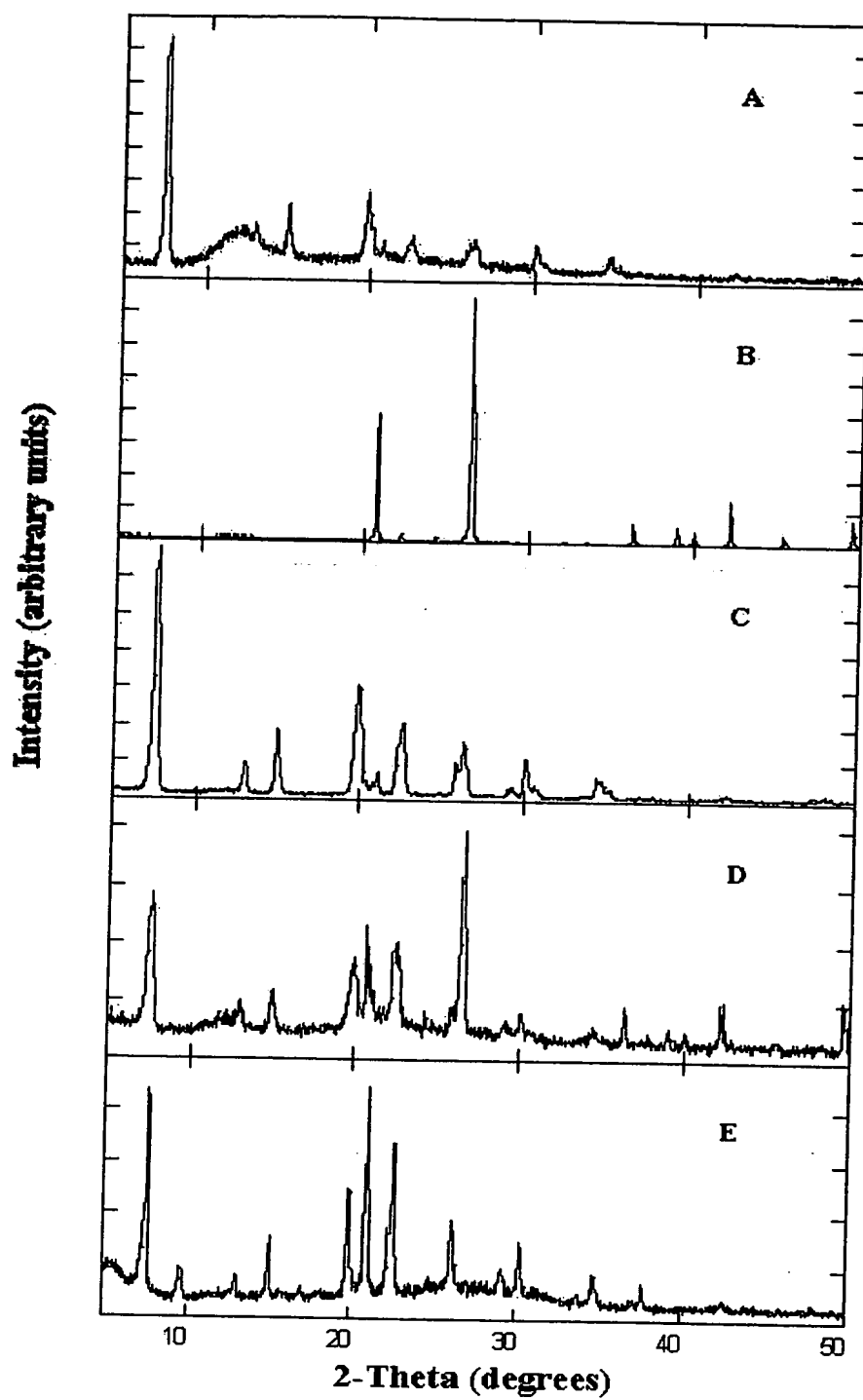


Figure 3. (A) ~ (E) X-ray diffraction patterns for products shown in Figure 2A to 2E respectively. .

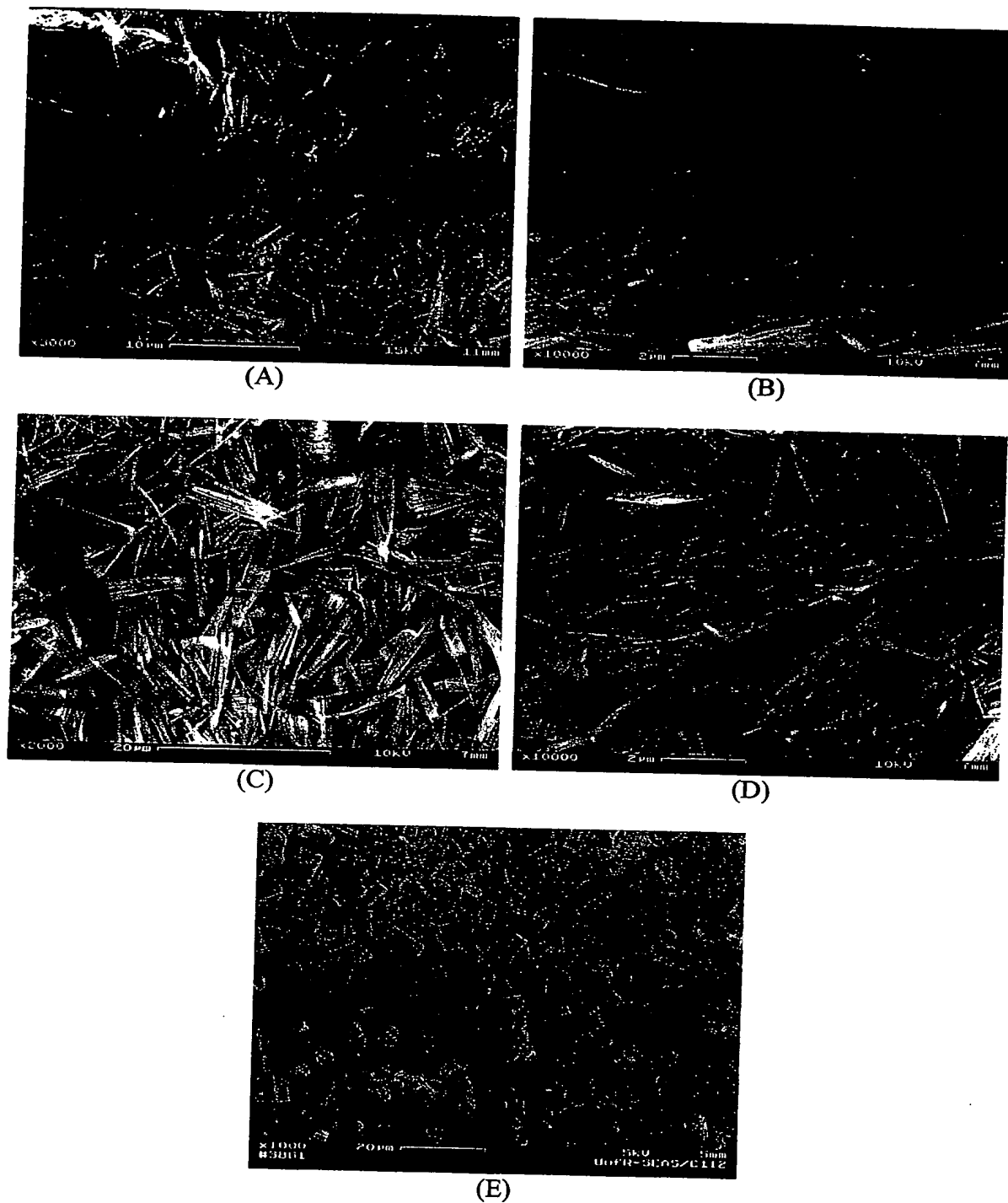
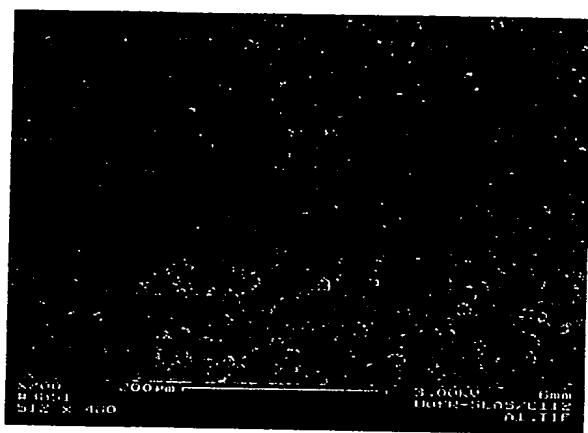
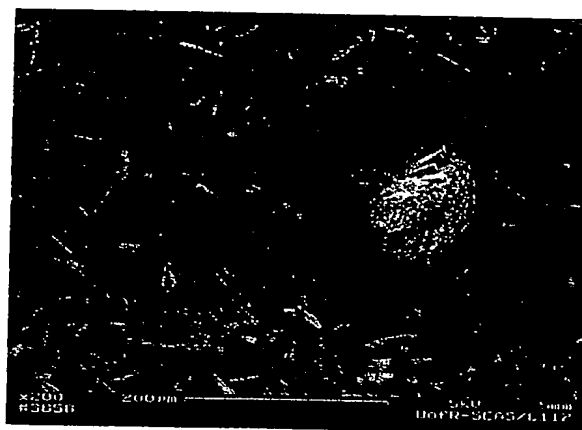


Figure 4. Products from microwave heating (17 min at 180°C) with double the standard amount of triethylamine. Figures 4A to 4D correspond to microemulsion compositions A to D respectively from Figure 1. Figure 4E is the control experiment without the microemulsion. The scale bars are A-10µm, B-2µm, C-20µm, D-2 µm, and E-20µm.

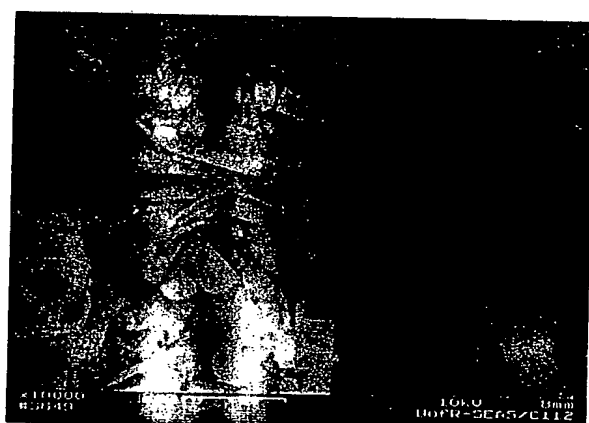


(A)

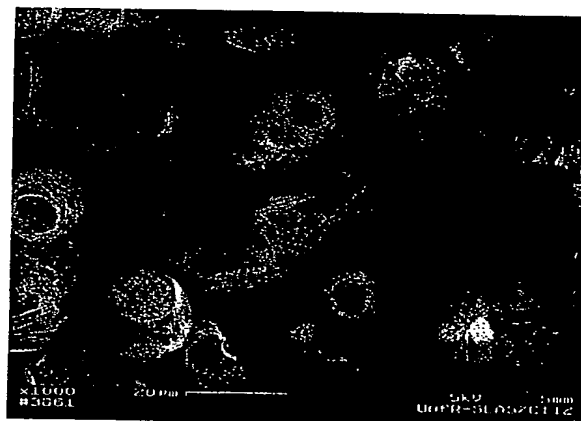


(B)

Figure 5. Products from conventional heating (6 hrs at 180°C) with standard triethylamine concentration. 5A is from a microemulsion with composition C' on Figure 1. 5B is the control experiment without the microemulsion. The scale bars are 200 μm .



(A)



(B)

Figure 6. Products from microwave heating (17 min at 180°C) with standard triethylamine concentration. Figure 6A is from a microemulsion with composition A' on Figure 1. Figure 6B is the control experiment without the microemulsion. The scale bars are A-2 μm and B-20 μm .

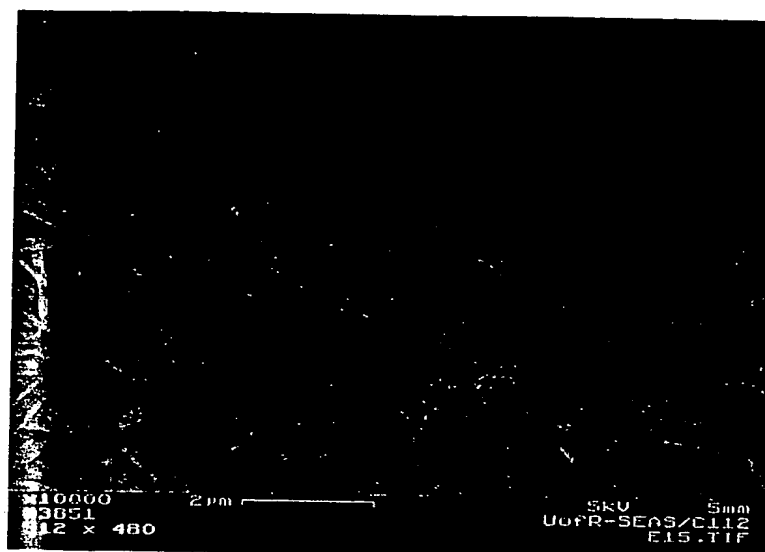
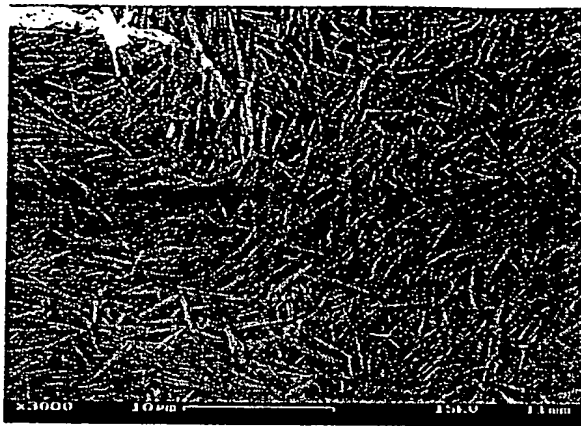


Figure 7. AlPO₄-5 fibers crystallized by microwave heating (17 min at 180°C) with double the standard amount of triethylamine from a microemulsion with the weight ratio of CPC to butanol is 3 to 1. The scale bar is 2 microns.



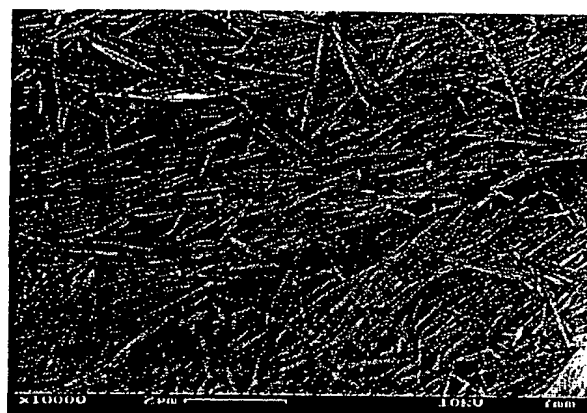
A



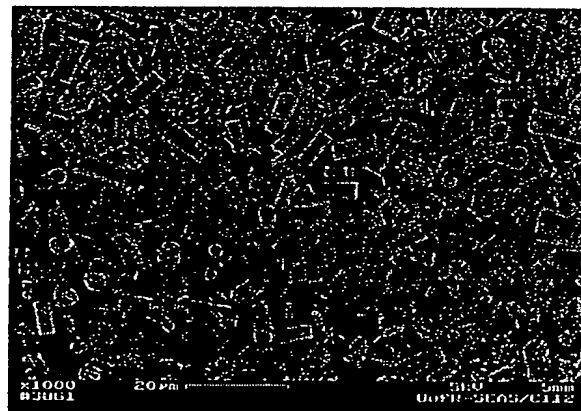
B



C

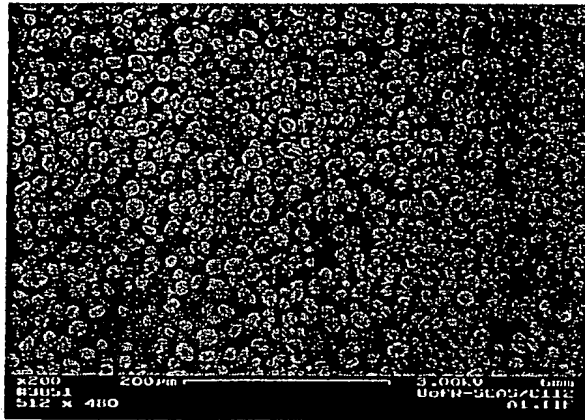


D

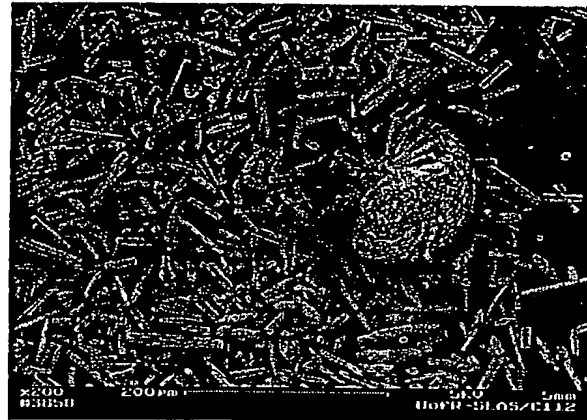


E

FIG. 7

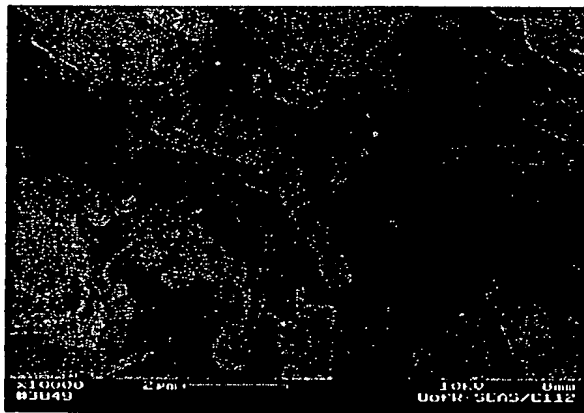


A

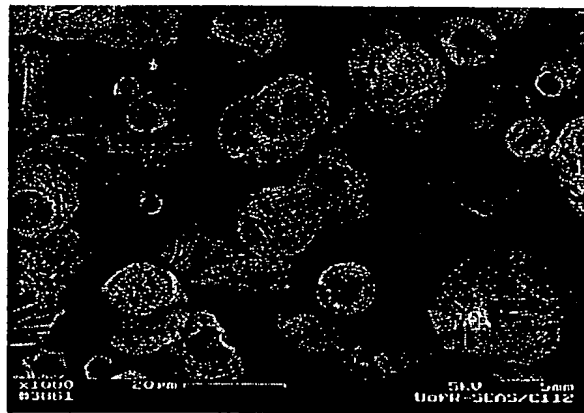


B

FIG. 8



A



B

FIG. 9

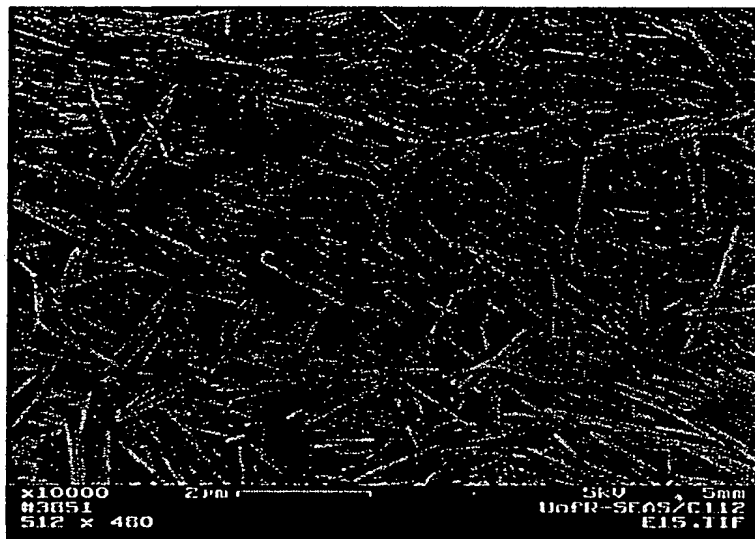


FIG. 10

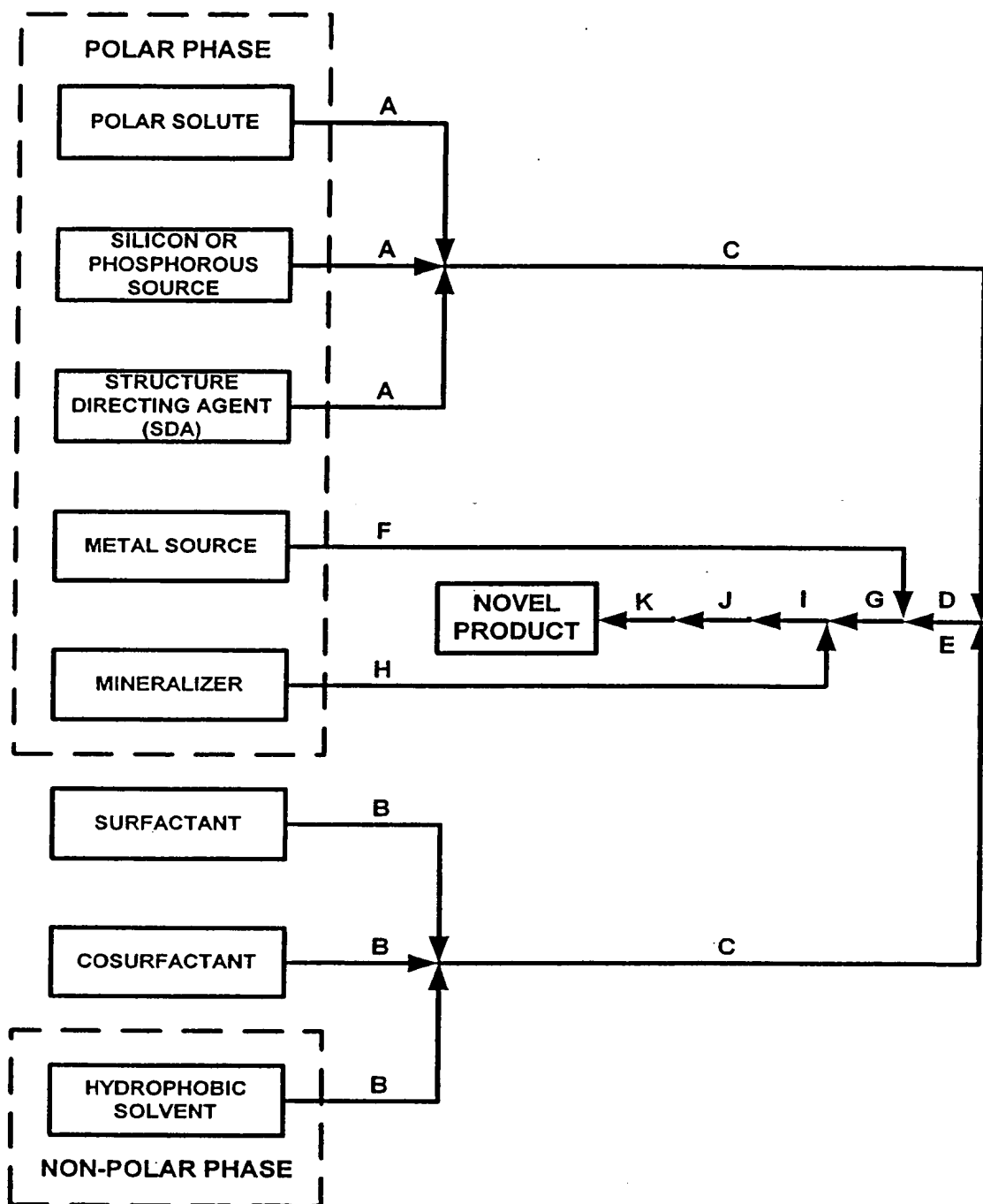


FIG. 11

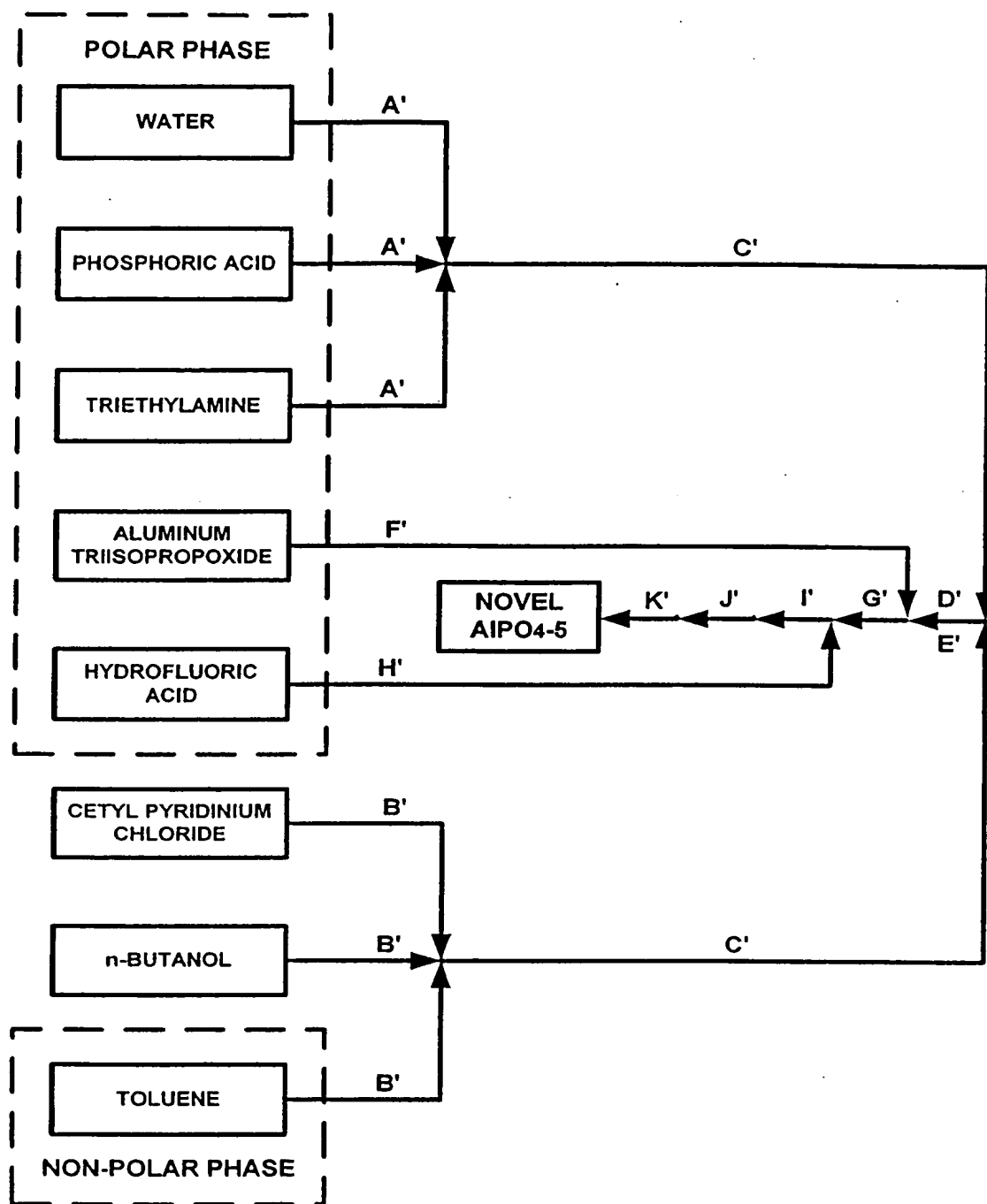


FIG. 12